subgluteal abscesses are recognized complications following a pudendal block,[6] but their incidence, which is low, is unknown. It has been suggested that the incidence of hematoma formation and infection of the hematoma is kept low by compression of the paravaginal tissues by the fetal head.[7(p351)]

A gallium citrate Ga 67 scan may be effective in visualizing a retropsoas abscess.[8] In this report, CT has been shown to be equally effective in visualizing such a retroperitoneal hematoma or abscess. The use of CT to diagnose retroperitoneal fluid collections was recently reviewed.[9] Retroperitoneal hemorrhage at the psoas muscle has been found by CT imaging when it arises as a consequence of a bleeding diathesis or anticoagulation, a ruptured abdominal aortic aneurysm,[9] or most frequently as a complication of femoral catheterization.[10] This is the first report of the use of CT to diagnose retroperitoneal hemorrhage complicating pudendal block. It is the diagnostic method of choice in studying retroperitoneal collections. It also is the most cost-effective technique while providing the same information about this process as can be derived from magnetic resonance imaging.

Vascular injury in the course of pudendal block is not a rare occurrence (as evidenced by positive aspiration tests). Fortunately, most patients with this injury are asymptomatic and have no sequelae, for reasons cited earlier. Physicians must, however, always remain cognizant that retroperitoneal bleeding may be life-threatening because of the possible size of this space. A key to the presence of an infected retroperitoneal hematoma is a postpartum temperature elevation in a patient with a dropping hematocrit. On the other hand, postpartum fever, usually of a wildly spiking nature that does not respond to antibiotics alone and in a patient whose hematocrit is stable, may point to a septic pelvic thrombophlebitis. The latter disorder, which is also rare—1 to 5 per 10,000 vaginal deliveries[11,12]—may similarly be diagnosed by CT imaging of the pelvis.[13-15] Septic pelvic thrombophlebitis requires the addition of heparin for a therapeutic response. Differentiating these two disorders by CT imaging could prevent a catastrophic outcome because the treatment of a patient with heparin in whom there is an underlying vessel perforation is contraindicated. Therefore, if pudendal block is followed by an unexplained fever postpartum, with hip or abdominal pain, CT may help to detect an infected retroperitoneal hematoma or abscess. Either disorder may be life-threatening or severely debilitating[4] and hence must be treated aggressively.

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A Human Case of Monocytic Ehrlichiosis With Adult Respiratory Distress Syndrome in Northern California

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IN THE UNITED STATES, human monocytic ehrlichiosis is an emerging tick-borne infectious disease caused by *Ehrlichia chaffeensis*, a newly identified rickettsial agent that infects mainly mononuclear phagocytes.[1-3] Recently a human granulocytic ehrlichiosis was documented that is caused by an as-yet-unnamed *Ehrlichia* species (closely related to *Ehrlichia equi*) that infects blood granulocytes.[3-5] In both types of human ehrlichiosis, reported cases have often been in older men with a recent history of tick bite or

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ABBREVIATIONS USED IN TEXT

ARDS = adult respiratory distress syndrome
CDC = Centers for Disease Control and Prevention
Ig = immunoglobulin

TABLE 1.—*Acute, Convalescent, and Follow-up Indirect Immunofluorescence Antibody Titers for Ehrlichia chaffeensis in Case-Patient, Northern California, 1994*

Laboratory and Antibody Test	Dates Serum Specimens Obtained		
	4/4	4/19	6/24
California VRDL			
IgG	<1:8	1:32	1:128
CDC			
IgG	<1:16	≥1:512	1:256
IgM	1:32	≥1:512	<1:16
CDC = Centers for Disease Control and Prevention, Ig = immunoglobulin, VRDL = Viral and Rickettsial Disease Laboratory			

exposure, and the initial illness was usually nonspecific with fever, chills, headache, malaise, myalgia, and nausea.[3,5-8] Laboratory testing often shows abnormalities such as leukopenia, thrombocytopenia, and elevated liver enzyme levels.[3,5-8]

Disease due to *E chaffeensis* was first documented in 1986,[9] and to date about 400 cases have been diagnosed from 30 states, with most cases located in the southern United States.[3,6,7] Asymptomatic *E chaffeensis* infection can occur.[10] Disease due to the newer human granulocytic *Ehrlichia* species was only recently documented, with cases from Wisconsin, Minnesota, Connecticut, and other northeastern states.[3,5,8,11] We report a probable human case of monocytic ehrlichiosis acquired in northern California.

Report of a Case

The patient, a 64-year-old man, was previously healthy without chronic medical problems. On April 1, 1994, he presented to a rural clinic in Marin County, California, because he had progressive fever, shaking chills, headache, myalgia, nausea, and malaise. On physical examination, his temperature was 39.8°C (103.6°F), and fine bibasilar rales were noted. A borderline interstitial pattern in the basilar areas was noted on a chest x-ray film. He was started on a regimen of oral cephalosporin and sent home pending blood test results.

The following day, when the patient's laboratory tests revealed a platelet count of 55 × 10⁹ per liter (55,000 per mm³), he was admitted to a hospital. On admission, he had a temperature of 39.2°C (102.6°F), a blood pressure of 140/90 mm of mercury, a pulse rate of 84 beats per minute, and a respiratory rate of 22 per minute, along with persistent rales in both lung bases. There was no cough, dyspnea, jaundice, rash, petechiae, or hepatosplenomegaly. He was alert and coherent but had difficulty with concentration and memory. Admission laboratory studies revealed a platelet count of 35 × 10⁹ per liter, a leukocyte count of 5.7 × 10⁹ per liter with a differential count of 0.55 (55%) band and 0.31 (31%) segmented forms, and a hemoglobin level of 142 grams per liter (14.2 grams per dl). A total bilirubin level was 47.9 µmol per liter (2.8 mg per dl), compared with 17.1 µmol per liter (1.0 mg per dl) the day before; the serum aspartate aminotransferase level was 87 U per liter, and the lactate dehydrogenase level was 1,171 U per liter. A prothrombin time, activated partial thromboplastin time, and fibrin-split products were within normal limits.

Despite aggressive antimicrobial therapy, his pulmonary function deteriorated progressively. He was transferred to the intensive care unit on the third hospital day and an endotracheal tube introduced on the fourth day. His clinical course and chest film findings were compatible with the adult respiratory distress syndrome (ARDS)

(Figure 1). Following the placement of a Swan-Ganz catheter and appropriate fluid volume management, his pulmonary function gradually improved. He was extubated on the 22nd day and discharged home on the 26th day of his hospital stay. On discharge, mild residual infiltrates were noted on a chest film and had resolved on follow-up two months later.

Treatment with ceftizoxime sodium and clarithromycin was initially started for "broad-spectrum" coverage, including gram-negative sepsis and bacterial pneumonia. When the patient was transferred to the intensive care unit, his antimicrobial drugs were intravenous ceftizoxime, vancomycin, gentamicin sulfate, and erythromycin, the last one subsequently changed to doxycycline on the fourth hospital day for possible rickettsial agents. Within hours after the regimen of doxycycline was instituted, the patient defervesced and remained afebrile for 12 hours, the first afebrile period since admission. He had fever again the next day, however, and experienced intermittent low-grade fever for the remainder of his hospital stay despite a later addition of metronidazole and fluconazole for possible anaerobic and fungal suprainfection. He did not defervesce entirely until the endotracheal tube was removed, his total parenteral nutrition discontinued, and most of his antimicrobial agents terminated on the 22nd hospital day.

Culture of cerebrospinal fluid and repeated cultures of urine and blood were negative for pathogens, and cultures of aspirate specimens from the endotracheal tube yielded *Candida* species. Endotracheal tube and nasal aspirates were negative for *Legionella pneumophila* and influenza A and B, respectively, by direct fluorescent antibody test. Acute and convalescent sera were negative for immunoglobulin (Ig) G antibodies to *Rickettsia typhi*, *Rickettsia rickettsii*, and *Coxiella burnetii* using standardized procedures.[12] Immunoglobulin G antibodies to *E chaffeensis*, however, showed a fourfold rise (Table 1) by the immunofluorescence method using antigen provided by the Centers for Disease Control and Prevention (CDC).[1] A review of blood smears did not reveal intraleukocytic inclusion bodies.

These sera were also forwarded to the CDC where *E chaffeensis* IgG[1] and IgM (J. Dawson, CDC, Atlanta, Georgia, oral communication, January 1996) results further confirmed an incidence of recent infection (Table 1).

No hantavirus antibodies were detected. Serologic testing for *E equi* antibodies, the serologic confirmation for human granulocytic ehrlichiosis, at the University of California, Davis, was negative.

Other relevant clinical aspects of the patient's illness included hematologic, hepatic, and neurologic abnormalities. The platelet count declined to 33×10^9 per liter, and his leukocyte count reached a nadir of 2.2×10^9 per liter on the fourth hospital day. After a course of intravenous doxycycline was initiated, his platelet and leukocyte counts improved and had returned to normal by the sixth hospital day. The aspartate aminotransferase level peaked at 134 U per liter, and his total bilirubin level rose to 63.3 μmol per liter (3.7 mg per dl) before falling. Neurologically, the patient became profoundly disoriented and agitated by the third hospital day. Cerebrospinal fluid glucose and protein concentrations and cell counts were normal, as was computed tomography of his brain. He improved slowly and was fully oriented a month after discharge, but had difficulty remembering details of his hospital stay.

Of epidemiologic importance, the patient frequently hiked three to four miles in the rural coastal area near his weekend home in Marin County. He reported receiving a tick bite on the right side of his neck in mid-March, about two weeks before his illness began, and distinctly remembered the tick bleeding when it was removed and discarded. He had no pets. Five months before the onset of his illness, he traveled to New York City and Washington, DC, but did not remember any tick bite or exposure during that trip.

Discussion

To our knowledge, this is the first reported human case of ehrlichiosis acquired in California. The patient's serologic test results indicated infection with *E chaffeensis* or a closely related *Ehrlichia* species and not the recently discovered human granulocytic ehrlichiosis as antibody to *E equi* was not demonstrated. He most likely acquired the infection in northern California, probably from the reported tick bite.

His clinical presentation and illness, except for ARDS, was typical of monocytic ehrlichiosis due to *E chaffeensis* infection described previously in the southern United States.[6,7] He had nonspecific symptoms initially, and his admission laboratory tests revealed thrombocytopenia and elevated liver enzyme levels; leukopenia developed soon after he was admitted to a hospital. After a regimen of doxycycline was instituted, these abnormalities resolved. Though the patient's fever resolved initially with the use of doxycycline, its intermittent return might have been due to one or a combination of factors other than his ehrlichiosis, such as total parenteral nutrition, atelectasis, or drug allergy. The neurologic involvement was not unusual; confusion has been noted in as much as 29% of patients with ehrlichiosis, clearing slowly with appropriate treatment.[6,7]

Of clinical interest was his ARDS, which has been noted but not commonly in previous reports of ehrlichiosis. In a recent review of 237 cases of human ehrlichiosis, only 7 of the patients (3%) had pulmonary infiltrates.[7] In
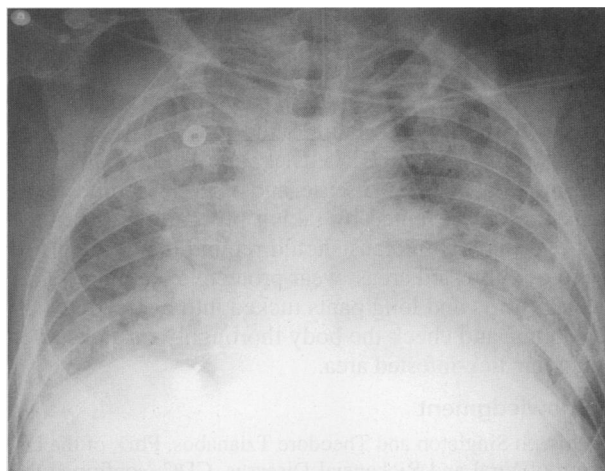

Figure 1.—A chest radiograph shows diffuse bilateral infiltrates consistent with the adult respiratory distress syndrome.

an earlier review of *E chaffeensis* cases, 14 of 32 patients (44%) who had chest roentgenograms taken had evidence of pulmonary infiltrates and 4 of 38 patients (11%) had pulmonary edema; 7 required intubation and mechanical ventilation.[6] In a recent report of cases of human granulocytic ehrlichiosis, two patients who died had pulmonary infiltrates on chest films, one of whom had ARDS.[5] Pulmonary hemorrhage and secondary pneumonias due to opportunistic pathogens have been reported in fatal cases,[8,11,13,14] but were not fully evaluated in this case because the patient recovered.

Probable vectors for *E chaffeensis* in the southern United States include the ticks *Amblyomma americanum* and *Dermacentor variabilis*,[15] whereas those for the human granulocytic ehrlichiosis agent in the northeastern United States include the deer tick, *Ixodes scapularis*, which is also the tick vector for Lyme disease in that region.[16] In California, the tick vector for either agent is unknown, but *Amblyomma* species are not present. *D variabilis* ticks are in this state, however, and may be possible vectors for the monocytic ehrlichiosis that occurred in this patient.

This case report adds monocytic ehrlichiosis to the list of tick-borne infectious diseases in California. The clinical presentation is similar to that of Rocky Mountain spotted fever, another rare tick-borne infection in California. Whereas a rash is noted in as much as 90% of patients with Rocky Mountain spotted fever, it is present in less than half of those with monocytic ehrlichiosis (and rarely in patients with human granulocytic ehrlichiosis). Because doxycycline or tetracycline is the antimicrobial drug of choice for both ehrlichiosis and Rocky Mountain spotted fever, its use should be started early in suspected cases while awaiting laboratory confirmation.[3] The laboratory diagnosis for both types of *Ehrlichia* species is more commonly made serologically, although a thorough examination of initial blood smears may reveal intraleukocytic inclusions called morulae, more often with human granulocytic ehrlichiosis than with monocytic ehrlichiosis.[1,3-5,8]

Polymerase chain reaction can provide the diagnosis during acute disease, but the test is currently available in only a few research centers. In California, Rocky Mountain spotted fever and monocytic and granulocytic ehrlichioses may be confirmed by sending acute and convalescent sera to the state's Viral and Rickettsial Disease Laboratory.

Ehrlichiosis, Lyme disease, and other tick-borne infections can be prevented by taking precautions to reduce tick exposure. Clinicians should remind their patients to avoid tick-infested areas, wear protective clothing (long-sleeved shirts and long pants tucked into boots), use tick repellents, and check the body thoroughly for ticks after being in a tick-infested area.

Acknowledgment

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